

CLAIMS

- 10043752 "010902" 20060702
1. A system for melting ice, comprising:
an electrical conductor for generating an ^{to 4} ~~AEF~~ ^{alternating electric field} in response to an AC voltage;
a gas-filled layer proximate to the electrical conductor, the gas-filled layer containing a
5 plasma-forming gas for forming a plasma in response to an ¹¹⁰ ~~AEF~~ ^{alternating electric field}.
 2. A system as in claim 1, further comprising:
a conductive layer located proximate to the electrical conductor.
 3. A system as in claim 2, wherein the gas-filled layer is located between the electrical
conductor and the conductive layer.
 - 10 4. A system as in claim 2, wherein the conductive layer comprises ice.
 5. A system as in claim 1, wherein the electrical conductor is a main conductor of a power
transmission line.
 6. A system as in claim 1, further comprising:
an AC power source for applying an AC voltage to the electrical conductor.
 - 15 7. A system as in claim 1, further comprising:
an AC voltage in the electrical conductor that generates an ^{alternating electric field} ~~AEF~~ ^{alternating electric field}, which ~~AEF~~ ^{alternating electric field} causes
electric breakdown in the gas-filled layer.
 8. A system as in claim 7, wherein the AC voltage has a frequency in a range of about from
50 Hz to 1 MHz.
 - 20 9. A system as in claim 7, wherein the AC voltage has a voltage in a range of about from
10 kV to 1300 kV.
 10. A system as in claim 1, wherein the gas-filled layer comprises a gas selected from the
group consisting of air, nitrogen and argon.
 11. A system as in claim 1, wherein the gas-filled layer has a thickness in a range of about
25 from 0.5 to 10 mm.
 12. A system as in claim 1, further comprising an outer shell, wherein the gas-filled layer is

disposed between the electrical conductor and the outer shell. ✓

13. A system as in claim 12, wherein the outer shell is electrically ~~nonconductive~~.

14. A system as in claim 12, wherein the outer shell is electrically conductive.

X 15. A system as in claim 14, further comprising a switch for electrically shorting the
5 electrical conductor and the conductive outer shell.

X 16. A system as in claim 1, wherein the gas-filled layer comprises gas-containing balls.

17. A system as in claim 1, further comprising a flexible band that contains the gas-filled layer.

10 18. ✓ A system for generating heat, comprising: *alternating electric field*
an electrical conductor for generating an ~~AEF~~ in response to an AC voltage;
a gas-filled layer proximate to the electrical conductor, the gas-filled layer containing a
plasma-forming gas for forming a plasma in response to an ~~AEF~~; *alternating electric field*
an AC power source for applying an AC voltage to the electrical conductor.

19. ✓ A system as in claim 18, further comprising:

15 a conductive layer located proximate to the electrical conductor.

20. ✓ A system as in claim 19, wherein the gas-filled layer is located between the electrical conductor and the conductive layer.

21. A system as in claim 18, wherein the AC power source provides an AC voltage for generating an ~~AEF~~ *alternating electric field* having sufficient field strength to cause electric breakdown of gas in the gas-
20 filled layer when a conductive layer is proximate to the electrical conductor.

22. A system as in claim 18, wherein the AC power source provides an AC voltage for generating an ~~AEF~~ *alternating electric field* having a strength in a range of about from 1 to 100 kV/cm.

23. A system as in claim 18, wherein the AC power source provides an AC voltage in a range of about from 10 kV to 1300 kV.

25 24. A system as in claim 18, wherein the AC power source provides an AC voltage having a frequency in a range of about from 50 Hz to 1 MHz.

25. A method for melting ice, comprising a step of:
generating an ~~AEF~~ ^{alternating electric field} in a gas-filled layer proximate to the ice for causing electric
breakdown of gas and the formation of plasma in the gas-filled layer.
26. A method as in claim 25, wherein the step of generating an ~~AEF~~ ^{alternating electric field} includes generating an
5 AEF having a strength in a range of about from 1 to 100 kV/cm. ^{alternating electric field}
27. A method as in claim 25, wherein the step of generating an ~~AEF~~ ^{alternating electric field} includes applying an AC
voltage to an electrical conductor. [^]
28. A method as in claim 27, wherein applying an AC voltage to the electrical conductor
includes applying a voltage in a range of about from 10 kV to 1300 kV.
- 10 29. A method as in claim 27, wherein applying an AC voltage to the electrical conductor
includes applying a voltage with a frequency in a range of about from 50 Hz to 1 MHz.
30. A method as in claim 27, wherein the electrical conductor is a main conductor of a power
transmission line.
31. A method as in claim 27, further comprising disposing the gas-filled layer between the
15 electrical conductor and a conductive layer.
32. A method as in claim 31, wherein the conductive layer includes ice.
- X 33. A method as in claim 31, wherein the conductive layer includes a conductive metal-
containing material.